INDIANA DEPARTMENT OF TRANSPORTATION

Production Management Division
Proudly Presents:

Those strongly encouraged to attend:

INDOT Production Staff (Districts and Central Office)

- Road, Bridge and Traffic Designers
- Project Managers

No more than one representative from each consultant pre-qualified in the following work type descriptions:

- 8.1 Non-complex Roadway Design
- 8.2 Complex Roadway Design
- 9.1 Level 1 Bridge Design
- 9.2 Level 2 Bridge Design
- 10.1 Traffic Signal Design
- 10.2 Traffic Signal System Design
- 10.3 Complex Roadway Sign Design
- 10.4 Lighting Design
- 10.5 Intelligent Transportation System Design

Highlighted Topics:

- ADA
- 3 Sided and 4 Sided Precast Structures
- Consultant Evaluation and Expectations
- Design Exception Justification
- Utility Coordination
- MDT Best Practices
- Roadside Safety and Guardrail Design
- Road Design and Bridge Design Breakouts

Monday, April 28, 2008
Indiana Government Center South
Conference Center Room A-C
8:00 AM to 4:00 PM
(Pre-Registration ends April 18th)

MAJOR MOVES

INDIANA DEPARTMENT OF TRANSPORTATION

To register (Email preferred), please contact,
Gary Mroczka, Director
100 N. Senate Avenue, Room N647
Indianapolis, Indiana 46204-2216

Work: 317-232-5226
Cell: 317-694-2193
E-mail: gmroczka@indot.in.gov

Road Design Breakout Session

Roadway Services:

- What parts of Roadway Services interacts with Consultants?

- Standards Section
- Review Section
- Traffic Section

Road Design Breakout Session

Published Road Design breakout Session

- New or recently published Design Standards / Procedures / Policies
- Partial 3R v 3R v 4R
- New Superelevation / Shoulder break
- Calculating Inlet Spacings / Layout of Storm Sewers

Road Design Breakout Session

Published Road Design breakout Session

We will discuss most of these items, but the itinerary has been changed to include items from each of the following;

Standards Unit (1st Group)

Review Team (2nd Group)

Traffic Team (3rd Group)

Road Design Breakout Session (Standards Section) (1st Group)

- Cable Barrier
- Bicycle Facilities (Shared-Use Paths)
- Best Practices for Inlets and Storm Sewers (in lieu of Inlet Spacings & Storm Sewers)
- New Superelevation / Shoulder Break

Road Design Breakout Session (Review Section) (2nd Group)

- ERMS Information
- Recent Design Memos
- Annual Construction Evaluation Report

Road Design Breakout Session (Traffic Section) (3rd Group)

- Traffic Squad (IPOC Projects)
- Signal Design Memo
- New Standards for Sign Trusses

Road Design Breakout Session (Standards Section)

- Cable Barrier (Yadu Shah)

Cable Barrier System (CBS)

High-Tension CBS NCHRP Report 350, Test Level 4 (TL-4)

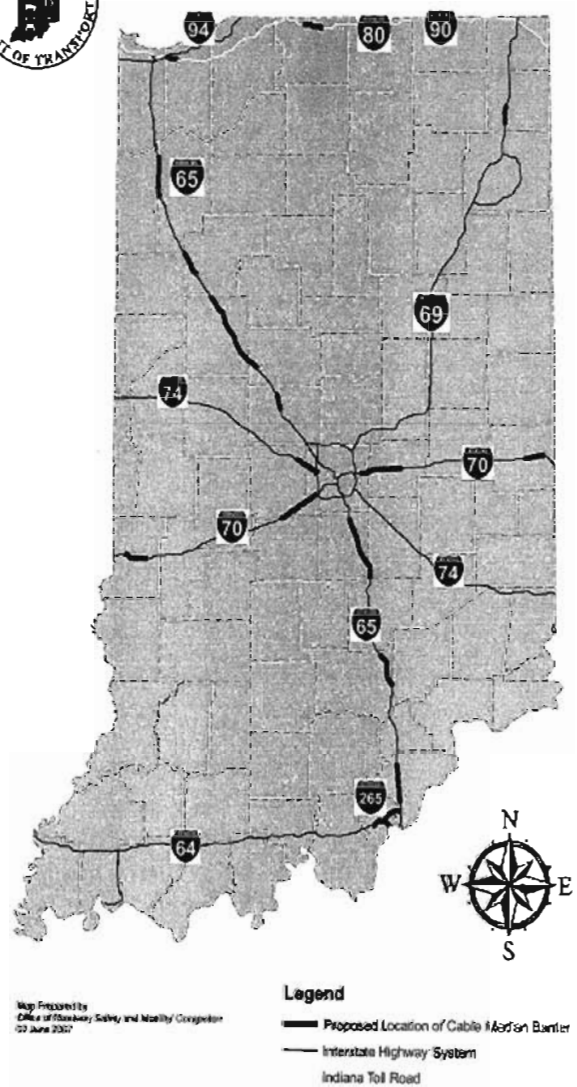
- There are no changes in design of rigid (concrete) and semi flexible (W-Beam and Thrie-Beam) barriers.
- INDOT will use a new barrier type, a flexible barrier, high-tension cable barrier system (CBS) for median installation.
- This CBS should be considered in the median of a high-speed, high traffic volume roadway where fatal median-crossover crashes have been reported or are anticipated.
- The CBS consists of 4 pre-stretched, individually anchored wire ropes in tension between safety terminal and held in position by intermediate line posts.

Why Cable Median Barrier?

- To avoid median-crossover crashes
- To reduce disabling injuries
- To save lives
- To decrease fatal crash costs
- Cable median barriers are safe, effective, cost efficient and have proven results

- INDOT will use high-tension pre-stretched 4 wire rope TL-4 CBS.
- CBS intermediate line post will have a socket tube cast-in-place in concrete for easy removal and replacement of line posts after vehicle impact.
- The contractor will select CBS from INDOT approved product list of CBS.
- All CBS in approved product list are proprietary items.
- INDOT will install 150 miles of CBS at a cost of approx. $22 million in 2008 and 2009.

Proposed Locations
Cable Median Barrier
Interstate System



Case for Median Barrier Installation on Select Segments of Rural Interstate System (Statewide)

Interstate Route No.	Begin RP	End RP	Segment Length (mi)	District/Sub-district	Des No.
I-64	117.00	120.00	3.00	S/Falls City Sub	0710151
I-64	121.10	121.40	0.30	S/Falls City Sub	0710151
I-285	90.40	96.60	6.20	S/Falls City Sub	0710152
I-65	08.80	20.00	11.20	S/Falls City Sub	0710150
I-65	44.00	54.94	10.94	S/Mad. and Colum. Sub	0710150
I-65	79.60	84.00	4.40	S/Mad. and Colum. Sub	0710150
I-65	84.45	98.47	14.02	S/Mad. and Colum. Sub	0710150
I-65	142.25	146.30	4.05	Crawford/Frankfort	0710149
I-65	157.30	183.00	25.70	Crawford/Frankfort&Fowler	0710149
I-65	192.70	198.00	5.30	Crawford/Frankfort&Fowler	0710149
I-65	218.00	220.80	2.80	LaPorte/Rensselaer	0710146
I-65	228.00	229.90	1.90	Laporte/Rensselaer	0710146
I-80/I-90	21.10	24.00	2.90	La Porte/LaPorte	0710145
I-80/I-90	71.00	77.30	6.30	La Porte/Plymouth	0710145
I-74	65.37	73.20	7.83	Crawford/Cloverdale	0710148
I-70	04.39	11.40	7.01	Crawford/Terre Haute	0710147
I-70	58.90	60.70	1.80	Crawford/Cloverdale	0710147
I-70	62.50	68.41	5.91	Crawford/Cloverdale	0710147
I-70	68.61	69.06	0.45	Crawford/Cloverdale	0710147
I-70	69.06	72.50	3.44	Greenfield/Indy	0710143
I-70	91.20	92.80	1.60	Greenfield/GF	0710143
I-70	93.80	104.50	10.70	Greenfield/GF	0710143
I-70	145.80	151.80	6.00	Greenfield/Centerville	0710143
[illegible]	125.80	130.30	4.50	Fort Wayne/Angola	0710154

CBS with High-Tension Pre-Stretched Cables

Why High-Tension CBS …….

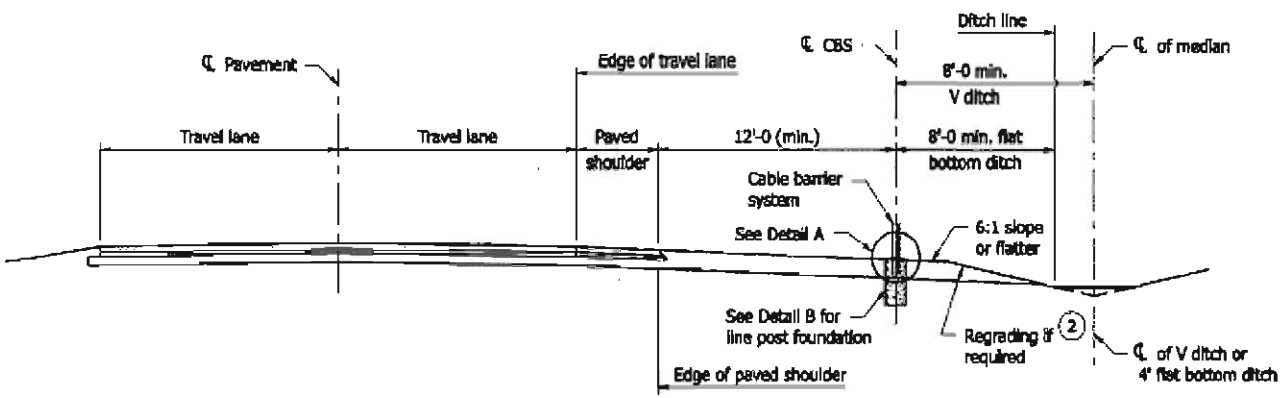
- Tensioning cables after installation improves the performance of the system by reducing deflection and increasing the potential to capture the impacting vehicle.
- High-tension system also results in less damage to the barrier after a vehicle impact.
- Has low maintenance cost

Why Pre-Stretched Cables …….

- Reduced dynamic deflection
- From the experience, contractors find it easier to tension

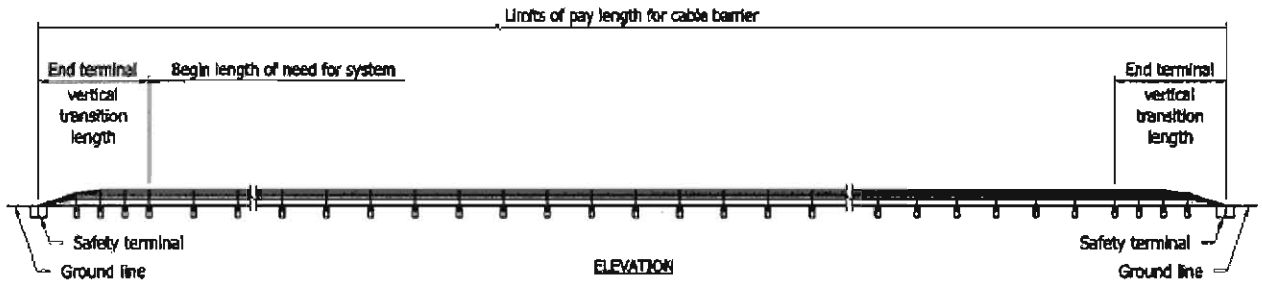
Roadway Design: Side Slope and Placement

- Avoid placing CBS in the median ditch due to conflicts with drainage inlets and dikes. These locations may be wet and offer poor support for post and anchor foundation.
- Maximum 8 feet deflection allowed at maximum 16 feet post spacing side slopes 6:1 or flatter.
- 16 feet from edge of travel lane with 4 feet paved shoulder width
- 8 feet from centerline of V ditch or 10 feet from centerline of flat bottom ditch line (4 feet wide ditch)
- The above placement of CBS requires a minimum median width of 48 feet for V ditch and 52 feet for flat bottom ditch.
- Lateral clearance to a rigid obstacle such as a bridge pier, sign support, utility pole, tree, etc, should be minimum 10 feet.
- A minimum lateral clearance of 10 feet from other parallel barriers (concrete barrier or W-Beam Guardrail)
- Geotechnical information will require to determine sizes of safety terminal foundations and line post foundations prior to installation of CBS.



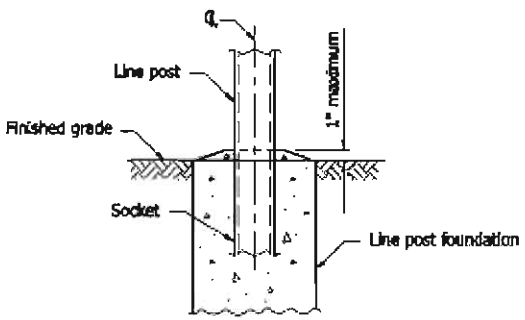
ELEVATION

LOCATION OF CBS IN MEDIAN

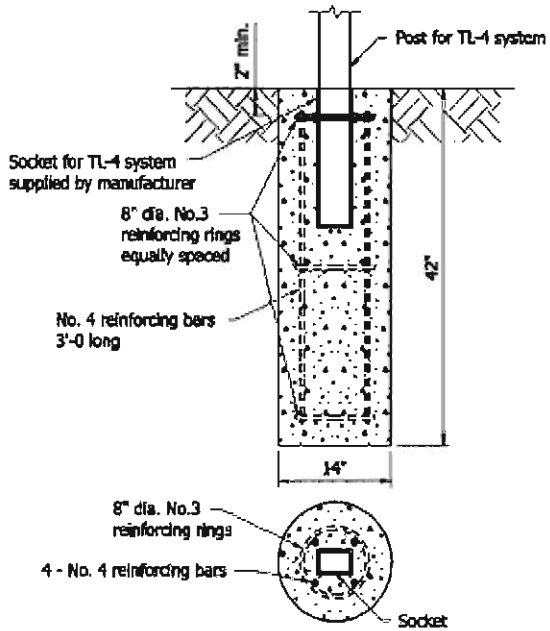


ELEVATION

TYPICAL CBS LAYOUT



DETAIL A



DETAIL B

MINIMUM SIZE AND REINFORCEMENT FOR LINE POST FOUNDATION FOR CBS TL-4 SYSTEM

NOTES:

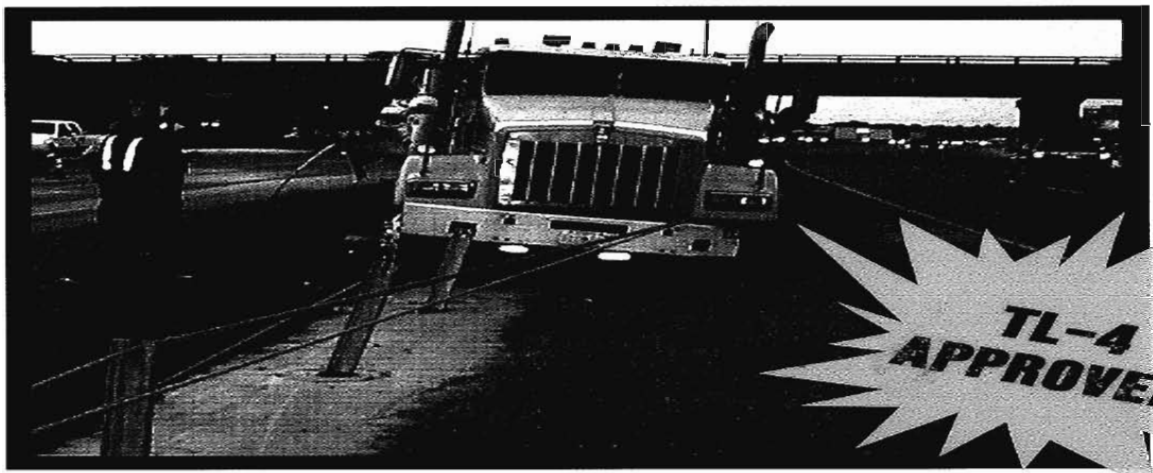
1. CBS: Cable Barrier System.
2. (2) Regrading of slope shall not extend beyond the centerline of the median and shall not impact the existing ditch flow line.
3. Cable barrier placement detail shown on this drawing is applicable to median with a maximum paved shoulder width of 4 ft. and the following median widths:
   a. A minimum median width of 48 ft. for a V ditch
   b. A minimum median width of 52 ft. for a 4 ft. wide flat bottom ditch.
4. CBS horizontal alignment transitions shall be made on a 50:1 or flatter taper.

INDIANA DEPARTMENT OF TRANSPORTATION

LOCATION OF CBS IN MEDIAN

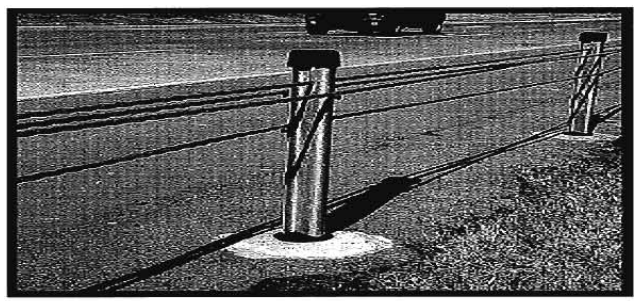
BRIFEN★USA INC.

WIRE ROPE SAFETY FENCE



NCHRP 350 APPROVED

Proven Design, Years of Real World Performance



Because You Only Want The Very Best

Road Design Breakout Session (Standards Section)

- Bicycle Facilities
  (Shared-Use Paths) (Brian Zafar)

Bicycle Facilities

Shared Use Paths

Introduction

- The purpose of the Indiana Bicycle Facilities Section in the INDOT Design Manual is to provide engineers, planners and designers with a primary source of guidance to implement the Indiana Trails, Greenways and Bikeways plan. Safe, convenient and well-designed facilities are essential to encourage bicycle use. This guide is designed to provide information on the development of facilities to enhance and encourage safe bicycle travel. The majority of bicycling will take place on ordinary roads with no dedicated space for bicyclists. Bicyclists can expect to ride on almost all roadways, as well as separated shared use paths and even sidewalks, where permitted, when special conditions warrant.

- This guide provides information to help accommodate bicycle traffic in most riding environments. It is not intended to set forth strict standards, but rather, to present sound guidelines that will be valuable in attaining good design, sensitive to the needs of both bicyclists and other users. However, in some sections of this guide, design criteria include suggested minimum guidelines. These are recommended only where further deviation from desirable values could result in unacceptable safety compromises.
- This Section regarding the design of bicycle facilities should be used in conjunction with other Sections in the IDM, the Indiana Manual on Uniform Traffic Control Devices (IN MUTCD) and the American Association of State Highway and Transportation Officials (AASHTO) Guide for the Development of Bicycle Facilities (1999).

Table of Contents

Table of Contents (continued)

Table of Contents (continued)

- **51-7.30 SELECTION**

- A local governmental agency will determine the bikeway type and location for the bicycle facility during the planning stages. If it is determined that a bicycle facility is feasible and can be properly funded, the designer should coordinate with the agency in the design of the bikeway facility.

- **51-7.50 SHARED - USE PATHS**

- **Introduction**

- **51-7.51 Shared-Use Paths**
- Shared-use path is a term adopted by the 1999 AASHTO Guide for the Development of Bicycle Facilities in recognition that paths are seldom, if ever, used only by bicycles. A shared-use path is typically located on exclusive right-of-way, with no fixed objects in the pathway and minimal cross flow by motor vehicles. Portions of a shared-use path may be within the road right-of-way but physically separated from the roadway by a barrier or landscaping. Users typically include bicyclists, in-line skaters, wheelchair users (both non-motorized and motorized) and pedestrians, including walkers, runners, people with baby strollers or dogs with people. Shared-use paths are usually designed for two-way travel except under special conditions. The guidance in this manual is for two-way facilities unless otherwise stated.

- **51-7.51(01) GEOMETRIC DESIGN OF SHARED-USE PATHS**
- The following sections provide guidelines for geometric design of shared-use paths. These guidelines are intended to be applied using a flexible design approach. Where recommended minimum design standards cannot be met due to right-of-way limits or other constraints, a detailed safety analysis should be conducted to determine the best compromise design solution and apply for a design exception from the INDOT Roadway Services Manager.

- **51-7.51(01.1) Separation Between Path and Roadway**
- When a two-way shared-use path is located adjacent to a roadway, a wide separation between the shared-use path and adjacent highway is desirable, demonstrating to both the bicyclist and the motorist that the path functions as an independent facility. The factors in determining how far away a shared-use path should be separated from the roadway include the posted speed of the road, the type of signs between the path and roadway, the amount of space available, and whether the roadway has a rural (shoulder and ditch) cross section or urban (curb and gutter) cross section.
- The separation distance between a path and a roadway depends primarily on the posted speed limit of the road. Recommended separations for rural (shoulder and ditch) and urban (curb and gutter) road cross sections are illustrated in **Figures 51-7C** and **Figure 51-7E** and detailed in **Figure 51-7D** and **Figure 51-7F**.

- **51-7.51(01.3) Design Speed**

- For the general design of shared-use paths, a bicycle design speed of **20 mph** is desirable. For descending grades **500 ft** or longer and **4%** or steeper grades, a bicycle design speed of **30 mph** is desirable. On unpaved paths, where bicyclists tend to ride more slowly, a bicycle design speed of **15 mph** may be used. However, since skidding is more common on unpaved surfaces, horizontal curvature design should take into account a lower coefficient of friction. The selected design speed should be maintained throughout the length of the shared-use path. Alternating design speeds is not recommended. If site conditions will not allow the appropriate path geometrics for the selected design speed, then, a lower design speed should be selected for the path except where a portion of the path is in a rural area and another path is in an urban area.

NOTE: All other slides presented in the Bicycle Chapter session have been deleted from this powerpoint to conserve space. The Chapter will be put online as soon as Commissioner Browning reviews it.

Road Design Breakout Session (Standards Section)

- Best Practices for Inlets and Storm Sewers

  (in lieu of Inlet Spacings & Storm Sewers)
- New Superelevation / Shoulder Break

(Richard VanCleave)

Best Practices for Inlets and Storm Sewers

- I. Introduction – This is a brief review of some items, many of which are found in the Design Manual, often overlooked or misinterpreted in the plan development process
- II. Inlet Related Items

A. Inlet Locations (also Catch Basins)

1. Always place Upstream of:

a) Driveways

b) Streets

c) Sidewalk curb ramps

d) Pedestrian walkways (crosswalks)

e) Reversals in pavement cross slopes

Best Practices for Inlets and Storm Sewers

f) Bridge decks

g) In gore areas – Interchange ramps, etc.

2. Roadside

a) Low spots adjacent to lawn

b) In ditches intercepting sheet flow

3. Sags in gutter grade

a) Short run – double frame inlet, grates properly aligned to accept flow

b) Medium run – inlet plus one flanking inlet

c) Long run – inlet plus two flanking inlets

Best Practices for Inlets and Storm Sewers

B. Driveway Treatments to Contain Gutter Flow

1. Provide slight hump in driveway grade near gutter line for down grade driveways
2. Provide face of curb line lip 1 to 1 ¼” high past drive entrance

C. Pavement Grades

1. Minimum longitudinal – 0.3%
2. Flat < 0.3% - roll gutter grade with inlet in sag
3. Slotted drains may be utilized

D. Utilities – coordinate location/elevation of pipes

Best Practices for Inlets and Storm Sewers

E. Grates

1. Should be bicycle safe where bicycles permitted
2. Grate width (transverse) should not exceed gutter width
3. Should be compatible with inlet/catch basin boxes
4. Correct orientation of vane grates (basically a construction problem)

F. Slotted Drain Usage

1. High side shoulder on superelevated pavements – longitudinally
2. Angled out from H-5 inlets in median shoulders next to concrete barriers

Best Practices for Inlets and Storm Sewers

c. Two smaller trunk lines, one on each side of roadway to avoid multitude of cross pipes under pavement or to better meet outfall elevation in flat areas

d. If no other option, place under center of right lane out of wheel tracks to avoid manhole cover clatter when vehicles pass over

e. Thoroughly review utility locations to avoid conflicts

H. Properly size manhole to accept all entering and exiting pipes while maintaining structural integrity of the manhole

Best Practices for Inlets and Storm Sewers

I. Assure adequate fall available to drain sewer – if in ditch, may have to provide extra wide outlet ditch to provide some detention capability

III. Shoulder Slope Break Point

A. Typical shoulder slope break point is at the right edge of the outside through travel lane

1. Exception – On PCCP with 14 foot wide right outside lane and HMA shoulder, slope break occurs at outside edge of 14 foot wide lane

Best Practices for Inlets and Storm Sewers

2. PCCP with concrete shoulders, slope break point is at right edge of outside travel lane
3. HMA pavements – Shoulder slope break point at right edge of outside travel lane

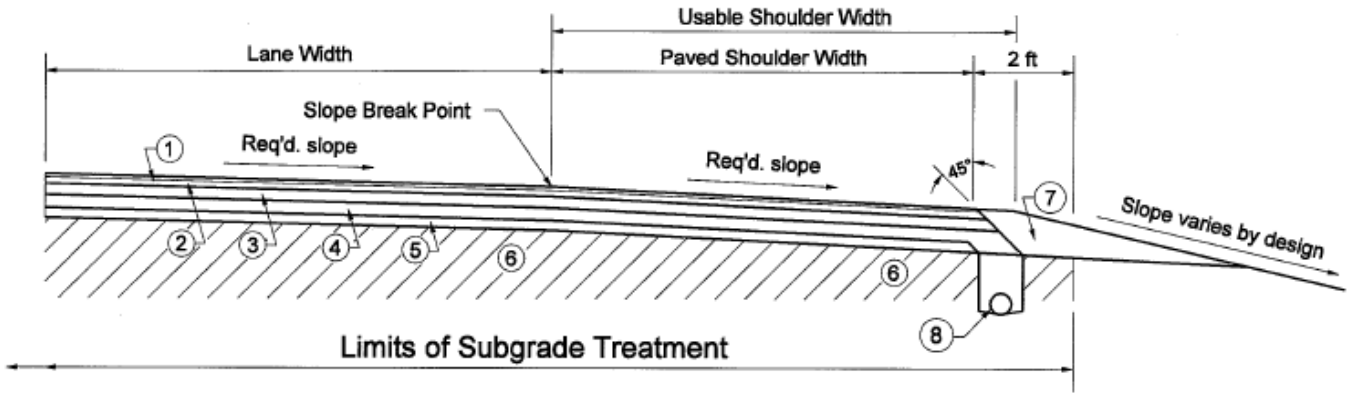
B. Underdrains

1. Subbase drainage layers extend out to and over underdrains
2. Shoulder surface lays extend over underdrains
3. Current 45-degree slope angles from outside edge of outside travel lane are used to set location of underdrains

Best Practices for Inlets and Storm Sewers

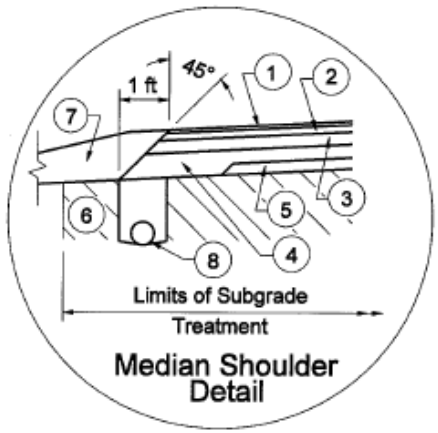
C. Chapter 52 – Currently being reviewed and revised with some typical section revisions which will further clarify the dimensions, etc.

New Superelevation / Shoulder Break



* All Pavement, Including All Shoulders

1. 165 lb/yd² HMA Surface 9.5 mm
2. 275 lb/yd² HMA Intermediate 19.0 mm
3. 440 lb/yd² Minimum HMA Base 25.0 mm
4. ** 440 lb/yd² QC/QA-HMA Intermediate OG25.0 mm
5. 440 lb/yd² HMA Base 25.0 mm
6. Subgrade Treatment
7. Variable-Depth Compacted Aggregate, No. 53
8. Pipe, Type 4, Circular, 6 in.



Median Shoulder Detail

* Open graded mixtures OG19.0 mm or OG25.0 mm should be QC/QA-HMA, 5, 76. For all other mixtures, see Section 52-9.02 to determine the appropriate HMA mixture designation.

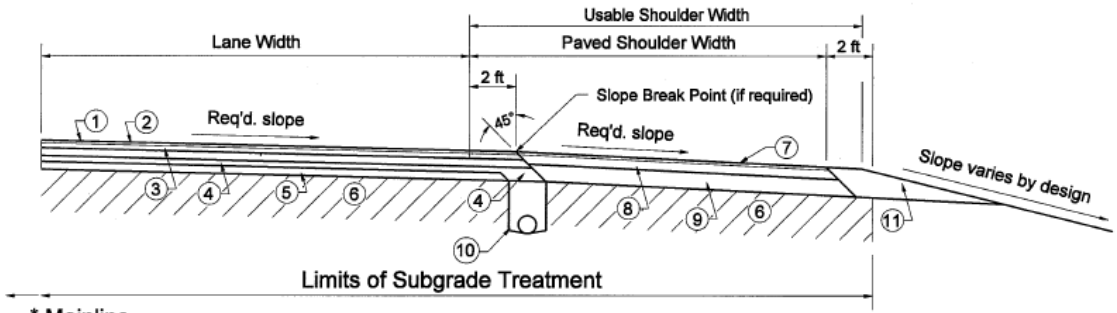
** If underdrain warrants are not met, Intermediate OG25.0 mm mix should be replaced with HMA Base 25.0 mm, minimum 495 lb/yd².

FULL DEPTH HMA PAVEMENT,

≥ 30 MILLION ESALs

Figure 52-13A

New Superelevation / Shoulder Break



* Mainline

① 165 lb/yd² HMA Surface 9.5 mm
② 275 lb/yd² HMA Intermediate 19.0 mm
③ 440 lb/yd² HMA Base 25.0 mm
** ④ 300 lb/yd² QC/QA-HMA Intermediate OG25.0 mm
⑤ 440 lb/yd² HMA Base 25.0 mm
⑥ Subgrade Treatment
⑩ Pipe, Type 4, Circular, 6 in.

* Shoulders

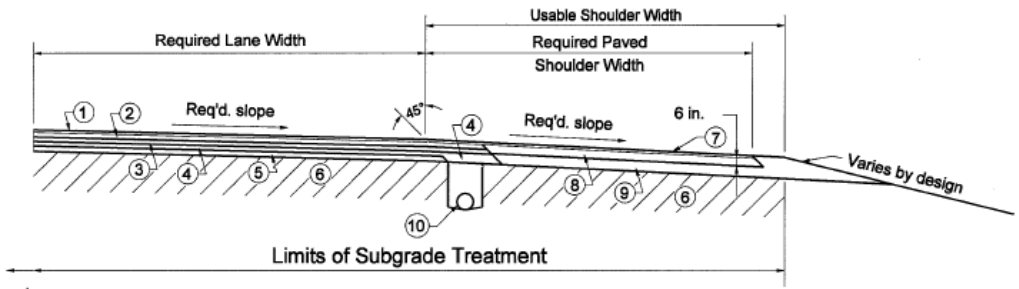
⑦ 165 lb/yd² HMA Surface 9.5 mm
⑧ 495 lb/yd² HMA Base 25.0 mm
⑨ Compacted Aggregate, No. 53, Base
(Depth equals mainline HMA thickness minus 6 in.)
⑪ Variable-Depth Compacted Aggregate, No. 53

* Open graded mixtures OG19.0 mm or OG25.0 mm should be QC/QA-HMA, 5, 76. For all other mixtures, see Section 52-9.02 to determine the appropriate HMA mixture designation.

** Where underdrains are not required, QC/QA-HMA Intermediate OG25.0 mm mix should be replaced with HMA Base 25.0 mm, 330 lb/yd².

FULL DEPTH HMA PAVEMENT,
10 MILLION ≤ ESALs < 30 MILLION
Figure 52-13B

New Superelevation / Shoulder Break



* Mainline Pavement (Section With Shoulders)

① 165 lb/yd² HMA Surface 9.5 mm
② 275 lb/yd² HMA Intermediate 19.0 mm
③ 275 lb/yd² HMA Base 19.0 mm
** ④ 275 lb/yd² Minimum QC/QA-HMA Intermediate OG 19.0 mm
⑤ 330 lb/yd² QC/QA-HMA Base 19.0 mm
⑥ Subgrade Treatment
⑩ Pipe, Type 4, Circular, 6.0 in.

* Shoulders

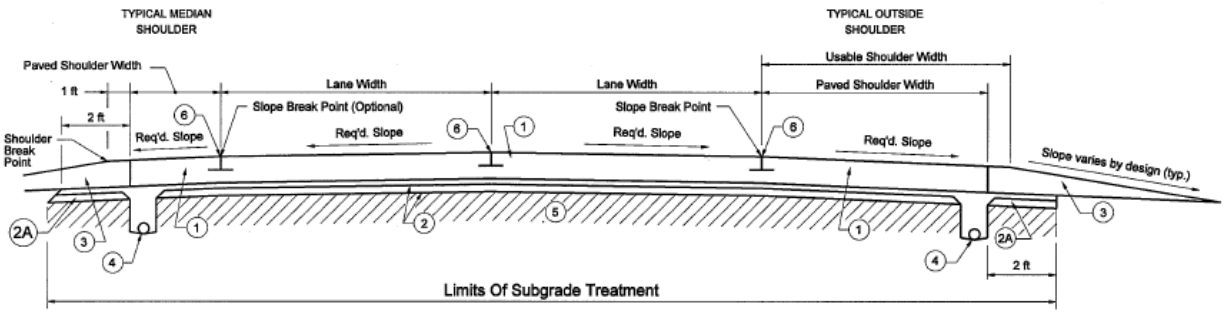
⑦ 165 lb/yd² HMA Surface 9.5 mm
⑧ 495 lb/yd² HMA Base 25.0 mm
⑨ Compacted Aggregate Base

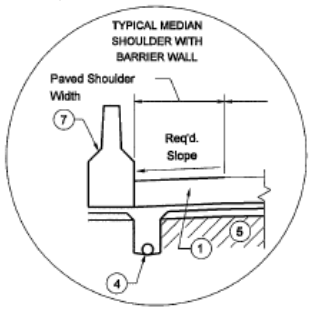
* Open graded mixtures OG 19.0 mm or OG 25.0 mm should be QC/QA-HMA, 5, 76. For all other mixtures, see Section 52-9.02 to determine the appropriate HMA mixture designation.

** If underdrain warrants are not met, Intermediate OG 19.0 mm mix should be replaced with HMA Base 19.0 mm minimum 495 lb/yd².

FULL DEPTH HMA PAVEMENT,
1 MILLION ≤ ESALs <10 MILLION
Figure 52-13C

New Superelevation / Shoulder Break





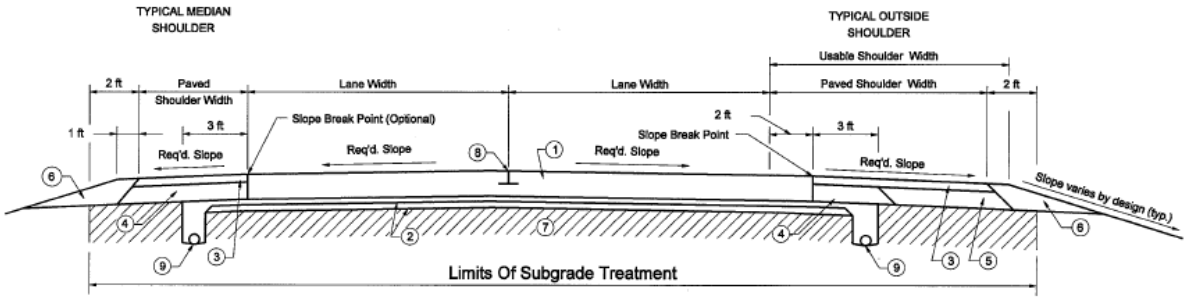
Mainline and Shoulders

1. PCCP
2. * Subbase for PCCP (3 in. Coarse Aggregate No.8 On 6 in. Coarse Aggregate No.53, Base)
2A. 6 in. Compacted Aggregate, No. 53, Base
3. Variable-Depth Compacted Aggregate, No. 53
4. Pipe, Type 4, Circular, 6 in.
5. Subgrade Treatment
6. Longitudinal Joint or Longitudinal Construction Joint. See Figure 52-13R for Pavement Joint Options.
7. Concrete Median Barrier

* Where underdrains are not required, Dense Graded Subbase should be used.

PCCP SECTION WITH PCC SHOULDER, ≥ 30 MILLION ESALs
Figure 52-13F

New Superelevation / Shoulder Break



Mainline

(1) PCCP

* (2) Subbase for PCCP (3 in. Coarse Aggregate No.8 On 6 in. Coarse Aggregate No.53, Base)

Shoulders

** (3) 165 lb/yd² HMA Surface 9.5 mm
330 lb/yd² HMA Intermediate 19.0 mm

** (4) HMA Base 25.0 mm

(5) Compacted Aggregate, No. 53, Base

(6) Variable-Depth Compacted Aggregate, No. 53

(7) Subgrade Treatment

(8) Longitudinal Joint or Longitudinal Construction Joint

(9) Pipe, Type 4, Circular, 6 in.

* Where underdrains are not required, Dense Graded Subbase should be used.

** See Section 52-9.02 to determine the appropriate HMA mixture designation.

PCCP SECTION WITH HMA SHOULDER, < 30 MILLION ESALs

Figure 52-13G

Road Design Breakout Session (Review Section)

- ERMS Information
- Recent Design Memos
- Annual Construction Evaluation Report

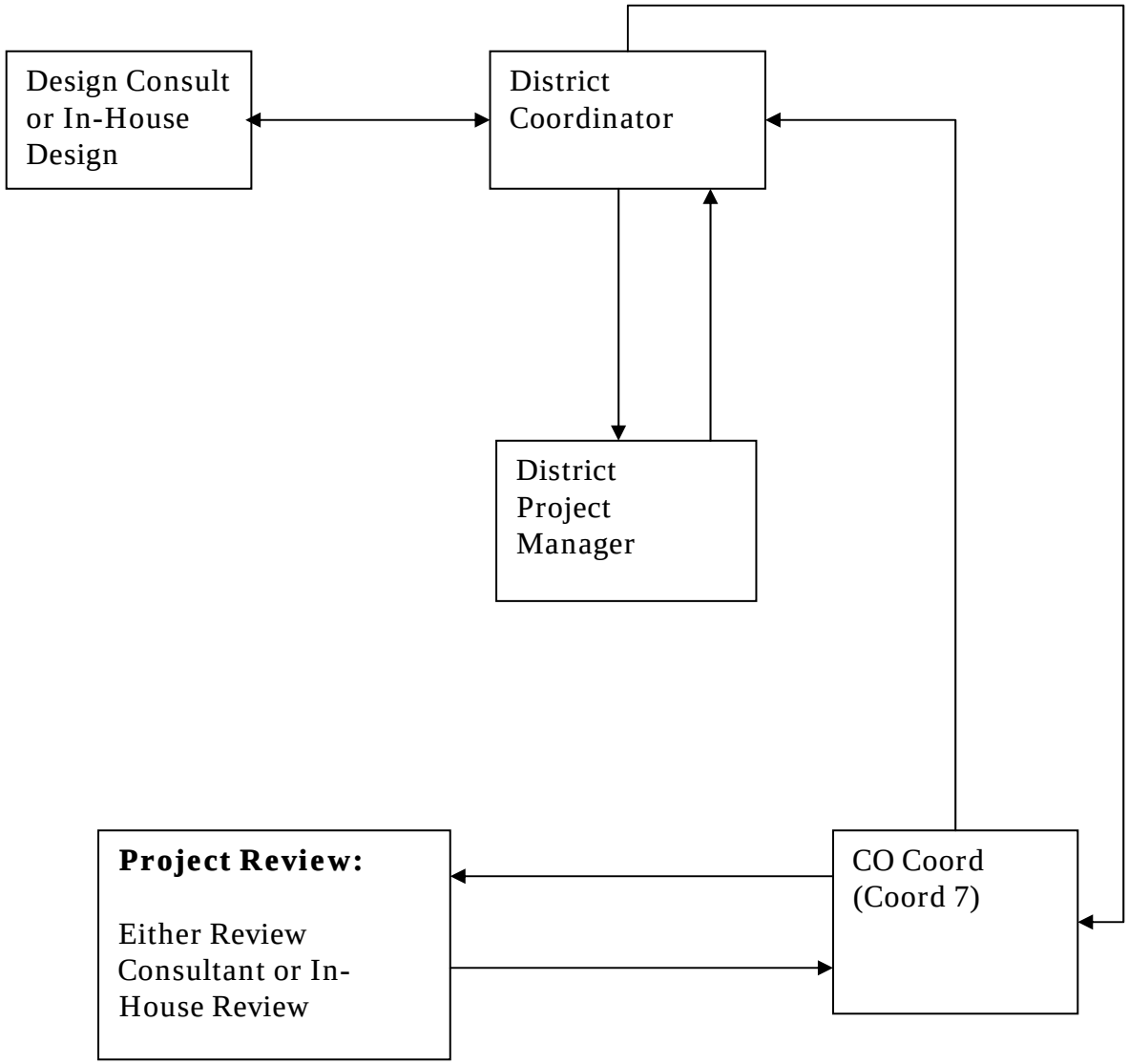
Road Design Breakout Session (Review Section)

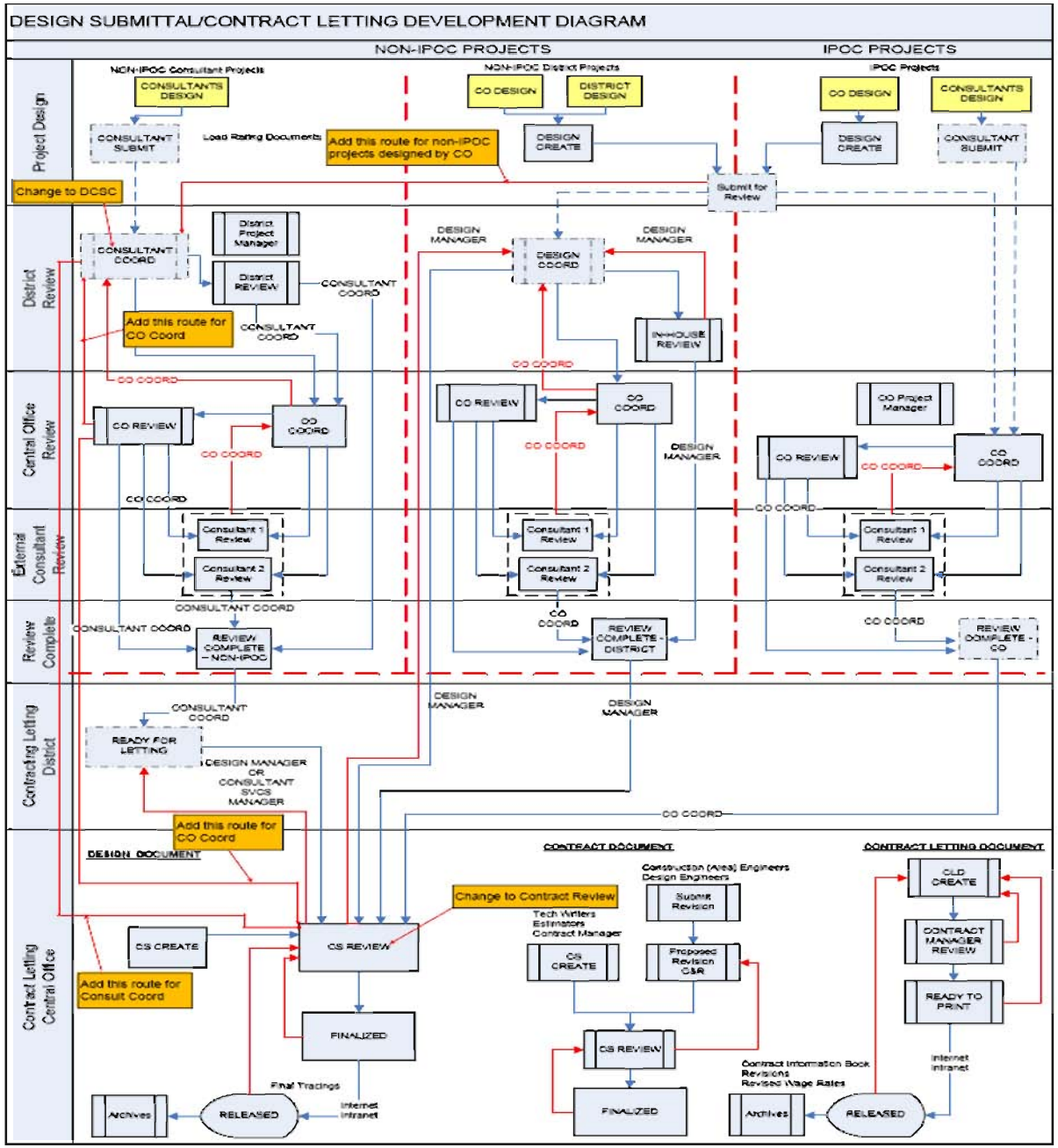
- ERMS Information (Shariq Husain)
- Recent Design Memos (John Wright)
- Annual Construction Evaluation Report (John Wright)

ERMS Update

- CO Coordinator 7 processes about 300-400 projects per month.
- Goal is to transition projects within 2 days or less
- Improvements have been made to the system
- Additional staff has been added (3 people now have role as coordinator 7)

ERMS Project Submittal Process




DESIGN SUBMITTAL/CONTRACT LETTING DEVELOPMENT DIAGRAM
NON-IPOC PROJECTS
IPOC PROJECTS
Project Design
District Review
Central Office Review
External Consultant Review
Review Complete
Contracting Letting District
Contract Letting Central Office
NON-IPOC Consultant Projects
CONSULTANTS DESIGN
CONSULTANT SUBMIT
Load Rating Documents
NON-IPOC District Projects
CO DESIGN
DISTRICT DESIGN
DESIGN CREATE
Add this route for non-IPOC projects designed by CO
IPOC Projects
CO DESIGN
CONSULTANTS DESIGN
DESIGN CREATE
CONSULTANT SUBMIT
Change to DCSC
Submit for Review
CONSULTANT COORD
District Project Manager
District REVIEW
CONSULTANT COORD
Add this route for CO Coord
DESIGN MANAGER
DESIGN COORD
DESIGN MANAGER
IN-HOUSE REVIEW
CO COORD
CO REVIEW
CO COORD
CO REVIEW
CO COORD
CO COORD
DESIGN MANAGER
CO Project Manager
CO REVIEW
CO COORD
CO COORD
CO COORD
Consultant 1 Review
Consultant 2 Review
Consultant 1 Review
Consultant 2 Review
Consultant 1 Review
Consultant 2 Review
CONSULTANT COORD
CONSULTANT COORD
REVIEW COMPLETE - NON-IPOC
CO COORD
REVIEW COMPLETE - DISTRICT
CO COORD
REVIEW COMPLETE - CO
CONSULTANT COORD
READY FOR LETTING
DESIGN MANAGER
DESIGN MANAGER
DESIGN MANAGER OR CONSULTANT SVCS MANAGER
CO COORD
Add this route for CO Coord
DESIGN DOCUMENT
CONTRACT DOCUMENT
CONTRACT LETTING DOCUMENT
Construction (Area) Engineers
Design Engineers
Change to Contract Review
Submit Revision
Tech Writers
Estimators
Contract Manager
CS CREATE
CS REVIEW
CS CREATE
Proposed Revision C&R
CS REVIEW
FINALIZED
FINALIZED
Add this route for Consult Coord
Final Tracings
Archives
RELEASED
Internet
Intranet
Contract Information Book
Revisions
Revised Wage Rates
Archives
RELEASED
CLD CREATE
CONTRACT MANAGER REVIEW
READY TO PRINT
Internet
Intranet

ERMS Improvements

- **Changes in the workflow (see the attached diagram)**
  - Add a route for non-IPOC projects designed by Central Office (CO) to go from Submit for Review state to Consultant Coord (DCSC) state.
  - Add a route for Consultant Coord (Dist. Coord) to transition docs from Consultant Coord (DCSC) state to CS Review (Contracts Review) state.
  - Add a route for CO Coord to transition docs from CO Review state to CS Review (Contracts Review) state
  - Add a route for CO Coord to transition docs from CO Review state to Consultant Coord (DCSC) state
  - Add a route for Consultant Coord (Dist. Coord) to transition docs from Review Complete – Non IPOC to District Review state

ERMS Improvements

- **Changes in security**
  - Grant view access to everybody who has been involved in the project, up to CS Review (Contracts Review) state.
  - Grant owner access (view, change, delete) to coordinators up to CS Review (Contracts Review) state.

- **Messaging**
  - Auto email to the designer, coordinator and project manager whenever the set of design documents arrives at Consultant Submit, Consultant Coord (DCSC) and CO Coord states. Use the Transmittal Letter as the tracking sheet.

- **Reporting**
  - A report on the time spent by each document at Consultant Coord (DCSC), District Review, CO Coord and CO Review states.
  - A report on the documents sitting in a smart folder.

File Title Naming Rules

Title Naming Rules

Use the title to identify the contents of the document, here are examples;

Submittal, Des #, Office of Review, What it is	**What does it mean?**
Hyd 0012345 for Bridge Services, Memo	Hydraulic review going to Bridges
Insp 0012345 for Bridge Services, Letter	Inspection Report for Br. Rehabs for Br
Scour 0012345 for Bridge Services, Calc	Scour calc being sent to Bridge Services
GR 0012345 for Roadway Services, Plans	Grade Review
PFC 0012345 for Rdwy or Bridge Serv, Plans	Preliminary Field Check
STG 1 0012345 for Rdwy or Bridge Ser, Letter	Stage 1 Plans (new PDP process)

Design Memorandums

A reminder to all to review the Design Memorandums on the INDOT Website. A few of the most recent ones are listed below (please be aware of when the memo is effective):

DM 07-13, Structural Backfill and Flowable Backfill, 10/16/07

Summary: Confusion on a recent letting. A few contracts did not incorporate into the plans. It is currently in the process of being revised to clear up confusion.

DM 07-14, Plan Development Process, 12/21/07

Summary: Indicates that Chapter 14 has been revised to match the PDP Manual. The revised Chapter is effective immediately for projects that have not received a notice to proceed. For Projects in the process, whether or not to use the new version will be made by either the District or Central Office.

DM 08-02, Use of Indiana Design Manual, English-Units Version, 3/18/08

Summary: This is a clarification. English units version of the Design Manual must be used for the design of each project for which design work was begun in english units. The metrics units version for all parts must continue to be used for each project for which design work was begun in metric units.

Design Memorandums

DM 08-03, Federal Aviation Administration (FAA) Tall-Structure Permit, 3/18/08

Summary: The FAA no longer issues a Navigable Airspace Permit. The new formal name is Indiana Tall-Structure Permit (informal name is Tall Structure Permit). Permit is obtained from the Local Programs Division's Office of Aviation where proposed construction may impact the navigable airspace of a public-use airport.

DM 08-05, Temporary Seeding, 3/18/08

Summary: Temporary-seeding related pay items have been left out on a number of let contracts, especially in multi-phase contracts in urban areas. Erosion control is currently receiving additional scrutiny from both IDEM and the Department's environmental personnel. The designer should be alert to recognize each work area where soil will be disturbed by construction operations and is likely to remain in an uncovered state for an extended period of time.

NOTE: Multi-season contracts need temporary mulching, in many cases, an item is not included (memo may be forthcoming)

DM 08-06, Temporary Pavement Markings, 4/18/08

Summary: emphasizes the guidelines and applications for: Paint, Temporary Raised Pavement Markings, Temporary Pavement Marking Tape, Thermoplastic/ Epoxy Markings and Buzz Strips.

Design Memorandums

Annual Construction Evaluation Report

Overview:

In 2005 the INDOT Roadway Services Section had Janssen and Spaans Engineering (JSE) compile the Construction Evaluations of Plans and Contract Documents for projects all over the state. The Construction Evaluations were for projects completed **between 1999 and 2004**. After reviewing and compiling all the evaluations, JSE summarized the information into a Report. The Report summarizes trends, common errors and issues.

The first Report was completed in June 2005. Since then there have been updates to the report. The **2007 Report** was sent to the Districts for comments and suggestions. We are currently in the process of summarizing the information.

NOTE: This report will be enhanced by 5 other reports;

Stage 1 Constructability Review evaluation

Stage 2 Constructability Review evaluation

Stage 3 Constructability Review evaluation

Pre-bid evaluation

Mid-Construction evaluation

Post Construction evaluation

INDOT Construction Evaluation Report

State Form 48655 (4-94)
Indiana Department of Transportation

INDOT Construction Evaluation of Plans and Contract Documents

Project Engineer's/Supervisor's Rating

District
Contract No. [redacted]
Des. No.
Route [redacted]
County/City/Town
Designer/Design Consultant [redacted]

INSTRUCTIONS

INDOT's Construction representative shall complete this form at predetermined intervals during construction and at the conclusion of the project. All appropriate boxes should be checked with the necessary comments added and the form signed. The completed evaluation will be sent to:

Walter Lanc
Quality Management Engineer
Indiana Department of Transportation
100 N. Senate Avenue, Room N642
Indianapolis, IN 46204-2216

The Department agrees that the information provided on this form is not a part of the contract document and is for the Department's information only, and the Department or its agents will not use any of the statements, answers, or any other information on this form against the Contractor: (1) when reviewing or considering any claim for additional compensation, (2) during litigation (specifically, it is not an admission or an admission against interest), (3) at any administrative hearing, or (4) for any other purpose whatsoever.

FOR OFFICE USE ONLY

DISTRIBUTION: *Check Appropriate Boxes*

- ☐ COMMISSIONER, INDOT
- ☐ CHIEF ENGINEER, INDOT
- ☐ DEPUTY CHIEF ENGINEER, INDOT
- ☐ CHIEF, DESIGN, INDOT
- ☐ CONSULTANT
- ☐ COUNTY COMMISSIONER / MAYOR
- ☐ COUNTY/CITY/TOWN ENGINEER
- ☐ OTHER

Please submit a separate evaluation form, if there was a difference in the quality of the roadway plans and the bridge plans.

Evaluation pertains to: ☐ Roadway Plans ☐ Bridge Plans ☐ Both ☒ Traffic Plans

GENERAL

1. Were the plans clear with sufficient detail? If no, what details were lacking or omitted?
   ☒ Yes ☐ No

GENERAL (Continued)

2. Were the special provisions clear and in sufficient detail? If no, which special provisions were inadequate and what additional information should have been scheduled?
   ☒ Yes ☐ No

3. Were the Standard Specifications and the Standard Drawings clear? If no, what was lacking or omitted?
   ☒ Yes ☐ No

4. Were the quantities reliable? If no, which items had to be revised?
   ☐ Yes ☒ No

   Many of the existing signal loops were damaged and needed replaced. The [illegible] and [illegible] [illegible] quantities.

   An undistributed quantity for these items to account for the near certainty of failed loops in these locations would have been helpful.

INDOT Construction Evaluation Report

GENERAL (Continued)

5. Did the pay items used match the work to be performed? If no, which pay items did not?
   ☒ Yes ☐ No

6. If the contract had working days rather than a completion date, was the number of days . . .
   ☐ too few ☐ too many ☐ about right ☒ N/A

UTILITIES/RAILROADS

7. Were the utilities accurately shown on the plans? If no, which utilities were not properly shown and what additional information should have been provided?
   ☐ Yes ☒ No ☐ N/A

8. Was the project free of unknown utilities? If no, what utilities?
   ☐ Yes ☒ No

INDOT Construction Evaluation Report

The Construction Evaluation Form contains 23 questions related to general contract items, construction plans, utilities/railroads, right-of-way and so on. The Report organizes the 23 questions into groups. The groups are:

- **Quantities and Pay Items**
- Utilities and Railroad
- Soils and Foundations
- Structures
- **Plans, Specifications, Special Provisions**
- R/W and Maintenance of Traffic
- Permits and Contract Work Days
- **Overall Project Rating**

INDOT Construction Evaluation Report

QUANTITIES/ PAY ITEMS

Question #4: Were the quantities reliable?

	YES	NO	Total Responses	N/A	Not Answered
Reviews	375	278	653	11	12
% Yes/No	57%	**43%**			

Question #5: Did the pay items used match the work to be performed?

	YES	NO	Total Responses	N/A	Not Answered
Reviews	535	118	653	16	7
% Yes/No	82%	**18%**			

INDOT Construction Evaluation Report

SUMMARY OF CONSTRUCTABILITY SCREENING MAGNITUDE OF CHANGES

Plans- Earthwork Distribution–

23 Major Changes
39 Moderate Changes
97 Minor Changes
422 None

Summary: 62 0f 581 **(11 %)** Rated Major and Moderate Changes

Quantities –

56 Major Changes
129 Moderate Changes
279 Minor Changes
132 None

Summary: 185 of 596 **(31%)** Rated Major and Moderate Changes

Pay Items -

39 Major Changes
94 Moderate Changes
276 Minor Changes
181 None

Summary 133 of 590 **(23%)** Rated Major and Moderate Changes

Quantities/ Pay Items Summary

QUANTITIES

•The most notable figure from this study of Construction Evaluations is that on average, **43% of the Construction Project Supervisors do not feel that the calculated quantities are reliable.**

•45% of the supervisors rated the accuracy of the quantity calculations as fair or poor.

•Of the actual change orders due to quantity errors or omissions, 31% were rated as major or moderate changes. It appears that when there are change orders due to quantity miscalculations, the required change orders for over 25% of the projects are significant.

PAY ITEMS

•In addition, on average, **18% of the Supervisors feel that the pay items in the Itemized Proposals do not match the work to be performed.**

•30% rate the accuracy of bid items as fair to poor.

•Of the actual change orders due to pay item revisions or omissions, 23% were rated as major or moderate changes. When change orders due to pay items are required, almost 20% of the time, the changes are considered significant.

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EARTHWORK DISTRIBUTION

•**11% of the Project Supervisors rated change orders due to earthwork distribution as major or moderate.** Earthwork distribution calculations do not appear to be a significant problem as compared to other incorrect pay items and quantities.

Conclusions

Based on the results of this study, it appears that overall, designers are not consistently calculating quantities correctly nor are they using the correct pay items on the Itemized Proposals. On the majority of the projects with incorrect quantities, the calculations for road items including asphalt pavement and compacted aggregate base for the shoulder wedging are some of the most common items requiring change orders. Typical errors also include pay items called out on the plans and in tables not matching quantity calculations nor the itemized proposal. In addition, on bridge projects there were several incidences where the concrete and re-bar quantities were tabulated for one element (i.e. one pier), but the quantities were not multiplied by the number of similar elements (i.e. other piers that were similar, but not detailed).

INDOT Construction Evaluation Report

PLANS/ SPECIAL PROVISIONS / SPECIFICATIONS

Question #1: Were the plans clear with sufficient detail?

	YES	NO	Total Responses	N/A	Not Answered
Reviews	482	175	**657**	14	5
% Yes/No	73%	**27%**			

Question #2: Were the special provisions clear and in sufficient detail?

	YES	NO	Total Responses	N/A	Not Answered
Reviews	603	63	**666**	6	4
% Yes/No	90%	**10%**			

Question #3: Were the Standard Specifications and the Standard Drawings clear?

	YES	NO	Total Responses	N/A	Not Answered
Reviews	607	36	**643**	12	20
% Yes/No	94%	**6%**			

INDOT Construction Evaluation Report

SUMMARY OF CONTRUCTABILITY SCREENING MAGNITUDE OF CHANGES

Plans – Alignments –

13 Major Changes
39 Moderate Changes
75 Minor Changes
456 None

Summary: 52 of 583 **(9%)** Rated Major and Moderate Changes

Plans – Drainage Plans-

25 Major Changes
52 Moderate Changes
108 Minor Changes
398 None

Summary: 77 of 583 **(13%)** Rated Major and Moderate Changes

Plans – Material Specifications-

11 Major Changes
34 Moderate Changes
84 Minor Changes
448 None

Summary: 45 of 577 **(8%)** Rated Major and Moderate Changes

Specifications –

14 Major Changes
33 Moderate Changes
86 Minor Changes
446 None

Summary: 47 of 579 **(8%)** Rated Major and Moderate Changes

INDOT Construction Evaluation Report

Plans, Special Provisions, Specifications Summary

On over 27% of the projects, the supervisors felt that the plans were not clear and did not have sufficient detail.

Of the actual change orders that were required due to plans, provisions and specifications, approximately 7% to 13% were rated as major or moderate changes.

Conclusions

Based on the results of our study, it appears that overall the project supervisors are not having difficulties dealing with the special provisions or the standard drawings. 22% though, rate the plans as not being clear nor having sufficient detail. Apparently, in general, the construction plans are lacking enough details for the projects to be constructed.

OVERALL SUMMARY AND PROJECT RATING

Question #23A: Were the construction drawings and specifications complete?

	Reviews	%
Better than Expected	32	5%
Met Expectations	485	72%
Needs to Improve	80	**12%**
Serious Problem	9	**1%**
No Opinion	20	3%
Not Answered	50	7%

Question #23B: Were the construction drawings and specifications accurate?

	Reviews	%
Better than Expected	30	4%
Met Expectations	465	69%
Needs to Improve	97	**14%**
Serious Problem	14	***2%***
No Opinion	19	3%
Not Answered	51	8%

INDOT Construction Evaluation Report

Question #23C: Were there a large number of contractor questions?

	Reviews	%
Better than Expected	32	5%
Met Expectations	483	71%
Needs to Improve	70	**10%**
Serious Problem	8	**1%**
No Opinion	33	5%
Not Answered	50	8%

Question #23D: Did the construction documents impact contractor's ability to meet schedule?

	Reviews	%
Better than Expected	30	4%
Met Expectations	488	72%
Needs to Improve	56	**8%**
Serious Problem	15	**2%**
No Opinion	34	5%
Not Answered	53	9%

Road Design Breakout Session (Traffic Section)

- Traffic Squad (Review and Design)
- Traffic Design Memos
- New Standards for Sign Trusses

(Alfredo Hanza)

Road Design Breakout Session (Traffic Section)

- TheTraffic Squad, part of Production Division. In our squad we are 5 engineers and our work is to design and review traffic projects. These can be specific Traffic projects or Traffic items part of large road jobs. Including lighting, signing and signals our primary review is on all traffic items of the IPOC jobs. We interact with the managers of the IPOC jobs and the consultant designers in the review of these jobs. We conduct our review on the computer and communicate with the designer by phone or email and hold meetings when necessary.
- At the beginning phase of these jobs we get with the designer on the existing scoping to define more specifically the objective of the work. At 30% of the road design we should review all existing signing and the layout of proposed messages of the signing and some of the lighting alternatives. At 60% of the design we should review all new signing cross sections and design structures. At 90% of the design we should review final traffic design. Of course we are always open to inquiries and technical advice at any time the designer feels necessary.
- All none IPOC Traffic jobs or Traffic items included on road jobs that are submitted to Coordinator 7 (which is our review squad in Production) are sent to us for review. Depending on our work load we will review or send back to the Coordinator for Consultant review.
- Our Traffic Squad does all in-house Traffic design for all road jobs assigned in-house. Also, at the District's request, we can assist with traffic design jobs when they feel assistance is needed.

Road Design Breakout Session (Traffic Section)

- I would like to emphasize a couple of points that designers should be aware of. First, we are requiring that any traffic signal design shall have counting capabilities for vehicles in each traffic lane approaching a signalized intersection and identify the counting loops in the loop tagging table. There is a memorandum dated January 18, 2007 that explains in detail how this is to be done.
- Second, designers should be aware that our existing Signing Box Trusses standard sheet is not to be used. They need to be updated to the AASHTO 2001, 4th Edition with interims to 2007 that include the Fatigue Factor. A Design Memorandum was sent last week from our Design Resources Engineer concerning this matter.

Road Design Breakout Session (Finish)

- Questions & Answers